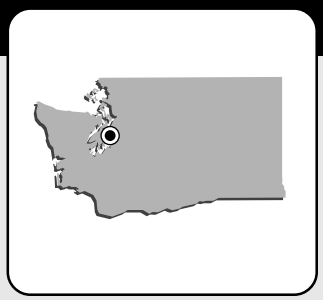
BANGOR NAVAL SUBMARINE BASE
WASHINGTON



Engineering Field Division/Activity:	EFANW
Major Claimant:	CINCPACFLT
Size:	6,692 Acres
Funding to Date:	$71,340,000
Estimated Funding to Complete:	$23,970,000

Base Mission: Provides support base for Trident submarines

Contaminants: Otto fuel, picric acid, RDX, TNT

Number of Sites:	
CERCLA:	38
RCRA Corrective Action:	0
RCRA UST:	4
Total Sites:	42

Relative Risk Ranking of Sites:			
High:	10	Not Evaluated:	0
Medium:	0	Not Required:	32
Low:	0		

NPL

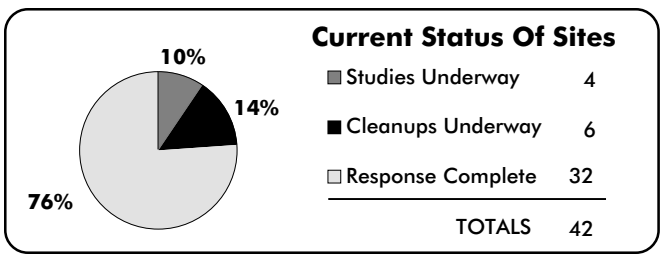
Sites Response Complete: 32

EXECUTIVE SUMMARY

Bangor Naval Submarine Base (NSB) is located on Hood Canal, which is ten miles north of Bremerton, Washington. Prior to its commissioning as a submarine base in 1977, the Navy facility at Bangor was primarily a transshipment and storage point for ordnance. Ordnance arrived by train and was shipped by boat to support the US military efforts in the Pacific Ocean during World War II and the Korean and Vietnam Wars.

As a storage facility, out-of-date and surplus ordnance was dismantled and steam cleaned, burned, or detonated on the base. The water from the steam cleaning demilitarization operation, Site 204 (former Site F), drained into an unlined lagoon and subsequently into the water table aquifer. The wastewater contained the ordnance compounds cyclonite (RDX) and trinitrotoluene (TNT) which washed through the ground and into the shallow aquifer. Over the years the RDX migrated with the flow of the groundwater. RDX is currently being detected approximately 3,000 feet northwest of the lagoon area. During this time, industrial wastes from supporting activities were also disposed of on-base. These were common disposal practices from the 1940's through the early 1970's. Contaminants found include otto fuel residues, electroplating wastes, ammonium picrate, the ordnance compound DNT, the gasoline component benzene, the organic solvent DCA, the chemical additive PCB, pesticides and herbicides. The Navy has changed its operational processes to prevent further contamination. The Bangor Ordnance Disposal Area was placed on the National Priorities List (NPL) in 1987 due to concerns about ordnance-contaminated soil and groundwater, and the remainder of the base was placed on the NPL in 1990. On 29 January 1990, a Federal Facility Agreement (FFA) was signed by the Navy, EPA, and the State of Washington. Sites were grouped into eight Operable Units (OUs) for the Remedial Investigation and Feasibility Study (RI/FS) phase.

Drainage from Bangor NSB empties into Hood Canal and Dyes Inlet. Trident Lake is located south of Site 2 which has a high relative risk ranking. There are a series of aquifers underlying the submarine base. Contaminants have been found in a seasonal aquifer, and the water table aquifer. The base receives its water from a deeper aquifer layer; the sea level aquifer. No contaminants have been detected in the sea level aquifer. Residents living around the base obtain their drinking water from nearby wells in this deep aquifer and the shallower aquifers.



Community relations for NSB Bangor are an ongoing active effort. The Community Relations Plan (CRP) was finalized in FY93. A local citizen's group obtained a grant from EPA and funds from the State of Washington Department of Ecology to oversee operations at NSB Bangor. A Restoration Advisory Board (RAB) was formed in FY95 and has held meetings about twice a month in 1996 and once a month in 1997.

Early removal actions include underground storage tank (UST) removals in FY92 and FY94. Cleanup action continued for UST 1 in FY97, and is expected to be completed in FY98. The final removal action for UST 4 began in FY97 and continues.

In FY93, the excavation and disposal of buried drums was completed at OU 7 and a bermed area was reconstructed. A Record of Decision (ROD) was signed in April 1996. Remedial Action (RA) for soils was completed in Summer 1997. RA for groundwater began in FY97, and was moved to OU2.

The Navy performed a time critical removal action in FY95 at OU 8 to protect human health. Volatile organic compounds (VOCs) above acceptable levels for drinking water were detected in a newly drilled community well. The well was never used by residents or certified for use by the health district. The Navy and health officials sampled nearby monitoring and residential wells. Since the compounds were only detected in the newly drilled well, the Navy drilled additional monitoring wells, found more VOC contamination, and then connected nearby residents to a public water supply in a second time critical removal action. The Navy has drilled additional monitoring wells to identify the nature and extent of the compounds in the aquifer. Based on the information, the Navy has installed a groundwater treatment system to contain the flow of chemicals from migrating off-base. The pump and treat containment system uses an air-stripper to clean up the aquifer and began operationing in April of 1997. The RI/FS that began in June of 1996 has completed determination of the nature and extent of contamination, performed a baseline risk assessment, and is currently evaluating the viability of in-situ bioremediation, or other measures needed to protect human health.

An RA for soils began in December 1995 at OUs 2 and 6 using composting to degrade ordnance compounds (primarily TNT). The RA was completed in FY97. The cost to compost the soils at both sites was about half the cost of incineration. Groundwater treatment design for OU 2 was completed in

BANGOR NSB
EXECUTIVE SUMMARY

FY96. This system was installed at the end of FY96 and began operating in FY97. An infiltration barrier was constructed over remaining contaminated deep soils at OU2, and part of the site above the infiltration barrier was reused to erect a recycling facility.

An RA for soils at OU1 was completed in FY97 (composting), and an RA for groundwater (pump and treat) was constructed and began operation.

RELEVANT ISSUES

ENVIRONMENTAL RISK

HYDROGEOLOGY - Drainage from Bangor NSB empties into Hood Canal and Dyes Inlet. Trident Lake is located south of Site 2 which has a high relative risk ranking. There are a series of aquifers beneath the submarine base. Contaminants have been found in a seasonal aquifer and the water table aquifer. The submarine base receives its water from a deeper aquifer layer; the sea level aquifer. No contaminants have been detected in the deeper aquifer.

One of the sites, Site 204 (Site F) is a former unlined lagoon that received wastewater from ordnance dismantling operations during the 1960's and 1970's. The wastewater also migrates into an overflow channel. Ordnance compounds were detected in the water table aquifer at Site 204. Off-base residents may receive water from this aquifer.

Most residents living around the base obtain their drinking water from nearby wells. The Navy performed a response action in FY95 to connect a neighborhood near Bangor NSB with public drinking water. This was a precautionary measure to protect human health. Volatile organic compounds (VOCs) above drinking water levels were detected in a newly drilled community well. The well was never used by residents or certified by use by the health district. The Navy and health officials sampled nearby monitoring and residential wells. Since the compounds were only detected in the newly drilled well, the Navy drilled additional monitoring wells, found more VOC contamination, and hence connected nearby residents to a public water supply. The Navy has drilled additional monitoring wells to identify the extent of the compounds in the aquifer. Based on the information, the Navy is installing a groundwater treatment system to contain the flow of chemicals from the base.

NATURAL RESOURCES - NSB is in the second stage of reforestation. Most of the base is covered with Douglas Fir. Many other tree species are also present, such as western red cedar, grand fir, and western hemlock. There are chaparral areas and wetlands on the base. There are two boggy areas (swamps) at the northern boundary of Camp Wesley Harris, and another near the center of the property on the eastern boundary. Some areas on NSB support an abundance of species and are ecologically significant. Wilkes Marsh provides nesting areas for waterfowl. Duck hunting is allowed at NSB during a prescribed season. The marine waters along the NSB shoreline contain an abundant marine fauna including shellfish, salmon and herring. The warbled marrelot is the only endangered species at NSB Bangor.

RISK - Using the Department of Defense (DOD) Relative Risk Site Evaluation Model 14 sites have been characterized as high.

REGULATORY ISSUES

NATIONAL PRIORITIES LIST - In 1987, Site 200 (former Site A) was placed on the National Priorities List (NPL) with a Hazard Ranking System (HRS) score of 30.42. On 30 August 1990, the rest of the base was listed on the NPL with a HRS score of 55.91 using information from the Initial Assessment Study (IAS). On 29 January 1990, the Department of the Navy (DON), EPA Region X, and the Washington State Department of Ecology signed a Federal Facility Agreement (FFA) for NSB Bangor. The EPA did not have sufficient information to delist any sites and requested additional studies at 22 sites. The FFA designated Sites B, 2, 4, 7, 10, and 18 for reentry into the Installation Restoration Program (IRP) process, added Site 26, identified Sites 27-30, and split Site C into Site 205 (East) and Site 206 (West). The FFA grouped the sites into the Operable Units (OUs) below. These OUs have been adjusted since the FFA was signed.

OU 1 - Site 200 (Site A)
OU 2 - Site 204 (Site F)
OU 3 - Sites 16, 24 and 25
OU 4 - Sites 205 (C-East) and Site 206 (C-West)
OU 5 - Site 5
OU 6 - Site 202 (Site D)
OU 7 - Sites 2, 4, 7, 10, 11, 18, 26, 30, 201 (Site B), and Site 203 (Site E)
OU 8 - Sites 27-29

PARTNERING - Partnering sessions with the regulatory agencies expedited the cleanup of contaminated areas in FY94. The meetings streamlined the decision-making process by reducing the number of deliverables. Issues were resolved in person rather than through formal review comments, responses, and revisions. Regular project meetings are very open. Frequent phone calls include regulators on many levels of decisons. Regulators attend all RAB meetings.

COMMUNITY INVOLVEMENT

RESTORATION ADVISORY BOARD - The Technical Review Committee (TRC) was formed in FY87 and met on a regular basis. The TRC was converted to a Restoration Advisory Board (RAB) in FY95 and met for the first time in January of 1996. The RAB met about twice each month in 1996 and once per month in 1997, and is provided with copies of all project submittals.

COMMUNITY RELATIONS PLAN - The Community Relations Plan (CRP) was finalized in 1993.

INFORMATION REPOSITORY - Information Repositories were established in 1990 and are located at NSB Bangor Branch Library in Silverdale, Washington and the Central Kitsap Library in Bremerton, Washington. A copy of the Administrative Record (the official file) is contained in the Information Repositories.

BANGOR NSB
HISTORICAL PROGRESS

FY83

Sites 1-37 - An Initial Assessment Study (IAS), equivalent to a Preliminary Assessment (PA) was completed and identified 37 potentially contaminated sites: 29 sites at NSB Bangor and eight sites at Jackson Park Housing. Jackson Park Housing has been transferred to Naval Shipyard (NSY) Puget Sound.
Sites 5, 6, 11, 12, 19, 200 and 202-206 - These sites were recommended for further investigation due to suspected contamination of groundwater and soil.
Sites 1-4, 7-10, 13-18, 20-23 and 201 - These sites were recommended for No Further Action (NFA) due to a lack of significant contamination or to the natural degradation of contaminants.
UST 4 - Consisted of eight tanks at the Public Works Industrial Area. Three tanks were removed prior to FY83. Two tanks were abandoned in place.

FY88

Sites 24 and 25 - These two sites were identified and recommended for a Site Inspection (SI).
Site 200 - This site was proposed for listing on the National Priorities List (NPL) due to concerns about ordnance-contaminated soil and groundwater. A Current Situation Report (equivalent to an SI) found that surface soil was contaminated with the ordnance compound TNT, burn mounds were contaminated with the ordnance compound RDX, and groundwater samples contained TNT and RDX.
Sites 5, 6, 11, 12 and 200-206 - These sites were recommended for an SI.

FY89

Sites 5, 6, 12, 24, 25 and 202-206 - A Current Situation Report (equivalent to an SI) found otto fuel present at Sites 205 and 206, the ordnance compounds TNT and RDX present in the soil and shallow groundwater at Sites 202 and 204, low levels of heavy metals (copper, silver and mercury) but no significant concentrations of waste constituents at Site 203, fluorescein and cadmium present at Site 6, low contaminant concentrations in surface water and soil at Site 12, ordnance and metals contamination found in soil at Site 24, and elevated levels of copper, lead, RDX and picramic acid at Site 25. All sites except Site 203 were recommended to continue to the Remedial Investigation/Feasibility Study (RI/FS) phase.
Site 6 - Nonhazardous waste was removed using station funds.
UST 2 - This site consisted of 16 abandoned tanks that were discovered under the Installation Restoration Program (IRP). A PA was completed.

FY91

OU 1 (Site 200) - An RI/FS was completed.
OU 2 (Site 204) - An Interim Record of Decision (ROD) was signed in September 1991 to contain the contaminants migrating into groundwater.

FY92

OU 1 (Site 200) - A ROD was signed for groundwater.
UST 1 - An inlet pipe leak was repaired.
UST 2 - Tanks were removed.
UST 3 - Two tanks at the Keyport/Bangor Docks, were removed.
Site 16 and OU 7 (Sites 4, 7, 10, 11, 18, 26, 30, 201 and 203) - A Site Characterization Report (equivalent to an SI) was completed. Further study was recommended for Operable Unit (OU) 7.

FY93

OU 1 (Site 200) - The passive soil washing design was completed.
OU 2 (Site 204) - The RI/FS phase was completed.
OU 3 - The RI/FS phase was completed. A ROD was completed with "limited action" for groundwater monitoring at Site 25 and a Remedial Action (RA) consisting of land deed restrictions at Sites 16 and 24.
OU 4 (Sites 205 and 206) - An RI/FS was completed. A Revision to the Final RI/FS changed the "limited action" preferred alternative to "no-action" and the ROD was signed.
OU 5 (Site 5) - An RI/FS was completed. A no-action ROD was completed.
OU 7 - A removal action was completed that involved the excavation and disposal of buried drums at three sites and the reconstruction of a bermed area at Site 2.

FY94

OU 1 (Site 200) - Changes were made to the FY92 ROD for groundwater. Granular activated carbon (GAC) has replaced passive soil washing as the treatment selected. There was no excavation of soil on steep embankments as originally planned.
OU 2 (Site 204) - Changes were made to the FY91 ROD for groundwater. The treatment technology selected was GAC.
OU 6 (Site 202) - An RI/FS was completed at OU 6. The ROD was completed for OU 6 and the contaminated soil was planned to be remediated using composting.
UST 2 - This site consisted of eight tanks and their tank lines. Six operational tanks were determined to have leaked and two tanks were removed.

FY95

OU 1 (Site 200) - A Remedial Action (Soil Washing) began in November 1994.
OU 2 (Site 204) - An Interim Remedial Action (IRA) began in October 1994.
OU 7 (Sites 4, 7, 10, 11, 18, 26, 30, 201 and 203) - The RI/FS was completed in October 1994.
OU 8 (Sites 27, 28 and 29) - This OU was created when volatile organic compounds were found in the water table aquifer. The remedy included providing residential connections to the Silverdale Water District line. Pump and treat containment of groundwater containing possible volatile organic compounds is on the fast-track to avoid contamination of nearby residential wells. This action began in February.

FY96

Sites 10 and 26 of OU 7 - Initiate Long Term Monitoring (LTM), complete RA.
Sites 4, 7 and 30 of OU 7 - No Action as documented in the ROD.
OU 1 (Site 200) - The remedial action (soil washing) continued along with groundwater monitoring.
OU 2 (Site 204) - A Remedial Design for groundwater only was completed, and a remedial action was started on soil bioremediation (composting).
OU3 (Site 25) - Complete RA and continue 5-year monitoring.
OU 6 (Site 202) - A Remedial Design was completed for soil only; bioremediation (composting) and Remedial Action were started.
OU 7 - A ROD was signed in April. No action is planned for Sites 4, 7, 18, and 30. RD under development for Site 201. Removal of stockpiled soils at Sites 2 and 203/11 planned and contracts awarded. Completed RD at site 203 and 11.
OU 8 (Sites 27,28, and 29) - Implementation of a non-time critical removal action to stop volatile organic compound contamination migration from leaving the base began construction. A pump and treatment system utilizing an air stripper for removal of VOCs began design. A workplan for the RI/FS was completed.
UST 1 - Began RA.
UST 2 - Complete RA action.
UST 4 - Began Investigation.

BANGOR NSB
PROGRESS DURING FISCAL YEAR 1997

FY97

OU 1 (Site 200) - Confirmation Sampling. Carried out additional IRA on soil (composting) which accelerated and completed soil cleanup. Began construction of RA for groundwater.
Site 204 - Started RA for groundwater.
Sites 204 and 202 - RAs for soils (bioremediation/composting) completed. Composting was used to degrade ordnance compounds from the soils at Site 202 (formerly Site D) and Site 204 (formerly Site F).
Site 25 - Continue 5 year monitoring.
Sites 11 and 203 - RAs for groundwater begun (as part of OU2) and off-site disposal of contaminated soils completed. RC Site 203.
Site 2 - Off-site disposal removal action of contaminated stockpiled soils completed. Site turned into a ballfield by the SEABEES.
Site 201 - vegetated soil cover IRA completed.
Site 26 - Monitoring of sediments scheduled for FY98. Develop OandM and long-term monitoring (LTM) for Sites 201, 10, and 26.
Sites 27, 28 and 29 - Constructed pump and treat containment system. Continued quarterly monitoring. RI completed. Work on FS begun.
Sites 27, 28 and 203 - Completed IRAs.
Site 1 - Completed PASI. RC site.
Sites 1, 6 and 10 - Completed LTO. RC sites.
UST 1 - RA (Bioventing) continued. Sampling in August showed predicted progress toward cleanup.
UST 4 - IRA completed.

PLANS FOR FISCAL YEARS 1998 AND 1999

FY98

Site 200 - Complete Groundwater removal action.(pump and treat with GAC). Continue leachate treatment from soil basin. Develop OandM plan for RA. Write Remedial Action report for soil.
Site 204 - Complete IRA (pump and treat with GAC). Complete Soil Liner (Infiltration Barrier). Start OandM on Soil Liner.
Site 25 - Continue 5 year monitoring plan. Do 5 yr. review and close out site.
Site 202 - Surface water compliance monitoring. Complete IRA. Close out site.
OU 7 - Implement OandM at Site 201. Carry out 5th year sampling at Site 26.
Sites 27, 28 and 29 - Operate pump and treat containment system.
UST 1 - Confirmational sampling in August.
UST 4 - Complete construction of RA (SVE). Operate RA. Complete CAP and IRA.
Site 100 - Carry out 2 removal actions.
Site 2 - Complete RA. RC site.
Sites 10 and 11 - Complete 1 and 3 IRAs, respectively.

FY99

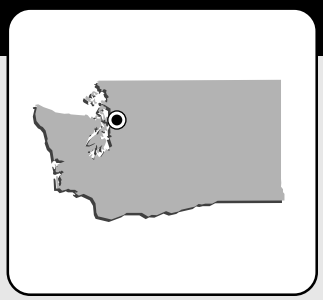
Site 200 - Complete RD. Continue groundwater removal action.(pump and treat with GAC). Continue leachate treatment from soil basin. Write Remedial Action report for groundwater.
Site 204 - Continue RA (pump and treat with GAC). OandM on Soil Liner. Write Remedial Action report for water.
OU 7 - OandM at Site 201. Do five year review and close out Site 26.
Sites 27, 28 and 29 - Operate pump and treat containment system. Sign ROD. Complete RIFS.
UST 4 - Confirmational sampling and operation of system.
Sites 27, 201 and 202 - Complete RA. Complete LTO at Site 202 and RC the site.
UST 1 - IRA complete.

PROGRESS AND PLANS

CERCLA	FY96 and before	FY97	FY98	FY99	FY00	FY01	FY02	FY03 and after
PA / SI	36	1						
RI / FS	19			3				
RD	4			1	3			
RAC	3	4	1	3	1			2
RAO		3		1		1		5
IRA	6(6)	6(8)	4(9)		1(1)	1(1)		1(1)
RC	24	5	1	1		1		6
Cumulative % RC	63%	76%	79%	82%	82%	84%	84%	100%

UST	FY96 and before	FY97	FY98	FY99	FY00	FY01	FY02	FY03 and after
SA	3							
CAP			1					
DES	1							
IMP	2				1			
IMO					1			
IRA	2(2)	1(1)	1(1)	1(1)				
RC	3				1			
Cumulative % RC	75%	75%	75%	75%	100%	100%	100%	100%

EVERETT NAVAL RESERVE CENTER
EVERETT, WASHINGTON



Engineering Field Division/Activity: EFANW
Major Claimant: CINCPACFLT
Size: 0.5 Acres
Funding to Date: $0
Estimated Funding to Complete: $75,000

Base Mission: Trains, administers and mobilizes Naval Reserve units.
Contaminants: POLs

Number of Sites:	
CERCLA:	1
RCRA Corrective Action:	0
RCRA UST:	0
Total Sites:	1

Relative Risk Ranking of Sites:

High:	0	Not Evaluated:	0
Medium:	0	Not Required:	0
Low:	1		

Sites Response Complete: 0

PROGRESS AND PLANS

CERCLA	FY96 and before	FY97	FY98	FY99	FY00	FY01	FY02	FY03 and after
PA / SI								
RI / FS								
RD								
RAC			1					
RAO								
IRA								
RC			1					
Cumulative % RC	0%	0%	100%	100%	100%	100%	100%	100%

JIM CREEK NAVAL RADIO STATION
JIM CREEK, WASHINGTON

Engineering Field Division/Activity: EFANW
Major Claimant: COMNAVCOMTELCOM
Size: 5,234 Acres
Funding to Date: $713,000
Estimated Funding to Complete: $1,444,000

Base Mission: Manages, operates and maintains a very low frequency (VLF) radio transmitting system, an electronic courier circuit for the receipt and delivery of messages and maintains the associated control circuits

Contaminants: Solvents, POLs, heavy metals

Number of Sites:

CERCLA:	10
RCRA Corrective Action:	0
RCRA UST:	0
Total Sites:	10

Relative Risk Ranking of Sites:

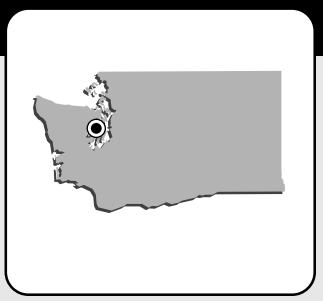
High:	1	Not Evaluated:	0
Medium:	0	Not Required:	8
Low:	1		

Sites Response Complete: 8

PROGRESS AND PLANS

CERCLA	FY96 and before	FY97	FY98	FY99	FY00	FY01	FY02	FY03 and after
PA / SI	8							
RI / FS						1		
RD			1					
RAC				1		1		
RAO								
IRA		1(1)						
RC	8			1		1		
Cumulative % RC	80%	80%	80%	90%	90%	100%	100%	100%

KEYPORT NAVAL UNDERSEA WARFARE CENTER
KEYPORT, WASHINGTON



Engineering Field Division/Activity:	EFANW
Major Claimant:	COMNAVSEASYSCOM
Size:	340 Acres
Funding to Date:	$21,750,000
Estimated Funding to Complete:	$39,629,000

Base Mission: Originally tested torpedoes; expanded to include proving, overhaul and issue of torpedoes

Contaminants: Chlorinated solvents, heavy metals, pesticides/herbicides, Otto fuel, POLs

Number of Sites:	
CERCLA:	11
RCRA Corrective Action:	0
RCRA UST:	2
Total Sites:	13

Relative Risk Ranking of Sites:			
High:	3	Not Evaluated:	0
Medium:	1	Not Required:	9
Low:	0		

NPL

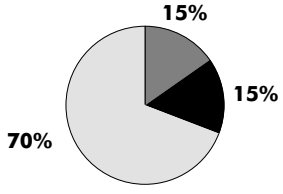
Sites Response Complete: 9

EXECUTIVE SUMMARY

Keyport Naval Undersea Warfare Center (NUWC), Division KeyportWashington is located on the Kitsap Peninsula in Puget Sound and is 25 miles west of Seattle, Washington. The baseThe NUWC is adjacent to a rural community, Keyport, Washington and close to another rural community, Poulsbo, Washington. The nearest urban area is Bremerton, Washington, which is eight miles to the southeast.

Operations that included plating, torpedo refurbishing, and disposal practices contributed to contamination found at the NUWC, Division Keyport. Environmental investigations since FY84 have identified several site types. Industrial and hazardous wastes were disposed of at the baseKeyport Landfill between the 1930's and 1970's. Hazardous materials included solvents, paints, sludge, and otto fuel. Between the 1940's and 1960's at the drum spill site, contaminants including solvents, petroleum products, otto fuel, and pesticides were spilled so that drums could be reused. Sewer sludge containing inorganic compounds was disposed of from the 1940's to the 1970's at the Sludge Disposal Area. The shoreline around the station has been contaminated with wastes discharged through the sewers from 1915 until 1980. These wastes include plating wastes, paints, solvents, petroleum products, and otto fuels. Keyport NUWC, Division Keyport was placed on the NPL in October 1989. The Navy has changed its operational processes to prevent further contamination. Sites ranked as high relative risk by the Department of Defense Relative Risk Site Evaluation Model primarily because of known contamination and identified migration pathways to both human and ecological receptors. Keyport NUWC, Division Keyport is being cleaned up under a Federal Facility Agreement (FFA) which was signed in 1990 by the Department of the Navy and the State of Washington, Department of Ecology and the US Environmental Protection Agency.

Since Keyport NUWC, Divison Keyport is located on a peninsula. A shallow sea level aquifer and a deep artisan aquifer underlie the base. The deep aquifer is a source of water for the station and the Public Utility District. The shallow aquifer is not known to be used as a drinking water source. Groundwater discharges into Liberty Bay, into a shallow lagoon on the north and east side of the peninsula, and into Dogfish Bay on the west side. Native Americans have traditionally harvested shellfish in Liberty Bay. However, the Department of Health closed shellfish harvesting in Liberty Bay in 1991 due to fecal coliform.



Current Status Of Sites

Studies Underway	2
Cleanups Underway	2
Response Complete	9
TOTALS	13

Recent sampling of sediments, surface water, and shellfish on Site 1 has shown concentrations of some contaminants in Dogfish Bay above normal ranges. This indicates that contaminants are migrating to the marsh area, the tide flats, and Dogfish Bay. However, bioassay results indicate no significant ecological impacts exist Chemical concentrations of contaminants observed in the marsh, tide flats, orand Dogfish Bay. may have potentially adverse ecological impacts, although recent bioassay results indicate no significant ecological impacts A recent health consultation performed by Agency for Toxic Substances and Disease Registry (ATSDR) confirmed that shellfish are safe to eat based on the chemical concentrations. However, since PCBs bioaccumulate and an ongoing source of PCBs exist via the groundwater, the future human ingestion pathway exists as a potential risk. Human ingestion impacts are currently being studied.

In addition to the upper and deep aquifers at Site 1, an intermediate aquifer exists. It has been shown that the upper and intermediate aquifers can communicate through the thin and leaky aquitard. Contaminants above decision criteria have been measured atbelow the landfill area in both the upper and intermediate this aquifers, and are currently showing migration off-site. However, the flow patterns of these aquifers are directly toward surface water rather than off-base land areas that may have private drinking water wells.This aquifer may potentially be a drinking water source.

The Remedial Investigation (RI) found low concentrations of metals in soil and sediment of the stream and lagoon adjacent to Site 2. The ROD was signed in September 1994. Groundwater monitoring started at Site 2 in October 1996.

Groundwater, tissue, and sediment sampling began at Site 8 in October 1996. Soil removal is expected towill be complete at Site 8 in FY98.

A Community Relations Plan (CRP) was completed in late FY90 and is currently being updated. Fact sheets are prepared on a quarterly basis, and six open houses and workshops have been held. A door-to-door community survey was conducted in 1994 to gauge public concern and improve communication with Keyport neighbors. A Technical Review Committee (TRC) was formed in FY89 and converted to a Restoration Advisory Board (RAB) in FY95. RAB members have reviewed and commented on work plans. RAB members have attended a RAB work group in San Francisco, and participated in regional workshops for Puget Sound RABs.

KEYPORT NUWC
RELEVANT ISSUES

ENVIRONMENTAL RISK

HYDROGEOLOGY - The area at Keyport is composed of sand, gravel, silt, and clay layers that overlie bedrock. Groundwater flows through the sand and gravel layers; these aquifers supply drinking water to Kitsap County, including Keyport. The silt and clay layers retard the vertical passage of groundwater and separate the various aquifers. These fine-grained layers are called aquitards. The shallow aquifer system is separated from the next lower aquifer (the deep aquifer) by a thick aquitard which prevents the downward migration of contamination. Beneath the Area 1 landfill, the shallow aquifer system consists of is divided into two aquifers (the upper and intermediate aquifers) by a separated by a thin aquitard. Studies of groundwater flow direction and chemical sampling from wells indicate that contaminated groundwater in the shallow and intermediate aquifers discharges to the marsh, tide flats, and LibertyDogfish Bay.

NATURAL RESOURCES - Native Americans have traditionally harvested shellfish in Liberty Bay. However, the Department of Health closed shellfish harvesting in Liberty Bay in 1991 due to fecal coliform.

RISK - Using the Department of Defense (DOD) Relative Risk Ranking System, primary contaminants at NUWC, Division Keyport sites are solvents, otto fuels, petroleum products, paints and plating wastes. Four of the sites have contaminants that are affecting groundwater. The landfill has wastes located below the water table. Surface aquifer discharges to an adjacent marsh which in turn drains to Liberty Dogfish Bay., an arm of Puget Sound. This potentially impacts shallow drinking water wells, surface water, and marine sediments as well as humans, flora and fauna exposed to the water or sediments. To reduce risk at the Plating Area, Site 8, an underground trench and several sumps were excavated and chromium-contaminated soil waswill be removed and replaced with clean fill.

REGULATORY ISSUES

NATIONAL PRIORITIES LIST - Keyport NUWC was included on the NPL on 4 October 1989 based on a Hazard Ranking System score of 32.6.

LEGAL AGREEMENTS - A Federal Facilities Agreement (FFA) was signed in April 1990 by the Department of the Navy, the State of Washington, Department of Ecology, and the US Environmental Protection Agency.

PARTNERING - To improve site management, regulatory agencies are involved in developing the scope of work, and during document planning phases, technical memoranda are prepared to convey issues before document finalization. Concurrent document reviews are also conducted.

COMMUNITY INVOLVEMENT

RESTORATION ADVISORY BOARD - A Technical Review Committee (TRC) was formed in FY89 and converted to a Restoration Advisory Board (RAB) in January 1995. The first formal RAB meeting was held in March 1995. The 20 RAB members have reviewed, commented on, and approved work plans, RI, and FS reports, and the were involved in the development of the proposed plan. . By-laws have been finalized. RAB members have attended a RAB work group in San Francisco, and participated in regional workshops for Puget Sound RABs.

COMMUNITY RELATIONS PLAN - A Community Relations Plan (CRP) was completed in September 1990 and is currently being updated in 1996. Fact sheets are prepared on a quarterly basis, a door-to-door community survey has been conducted, andand several six open houses and workshops have been held. A door-to-door community survey was conducted in 1994 to gauge public concern and improve communication with Keyport neighbors. Additional interviews were conducted in 1996.

INFORMATION REPOSITORY - In FY89, an Administrative Record was established at the Naval Facilities Engineering Command (NAVFAC) Engineering Field Activity, Northwest (EFANW). Information Repositories are located at the Kitsap Public Utilities District No. 1 in Poulsbo, and the Central and Poulsbo branches of the Kitsap County Library.

PROGRESS DURING FISCAL YEAR 1997

FY84

Sites 1-9 - An Initial Assessment Study (IAS) identified nine potentially contaminated sites. Sites 3-8 were determined not to pose a threat to human health or the environment. Sites 1, 2 and 9 were recommended for further investigation.

FY87

Sites 1, 2, 3, 5 and 9 - A Current Situation Report was completed for these sites. Sites 3 and 5, which were not recommended for further investigation in the IAS, were added at the Department of the Navy's (DONs) request, based on information obtained after the IAS was completed. The SI recommended further investigation of Sites 1, 2, and 9. In addition, the SI recommended a field survey to monitor for combustible gas and other organic vapors in soil and buildings at Site 1.

FY88

Site 1 - A landfill Gas Investigation was completed. Significant concentrations of methane were found in subsurface soil in the vicinity of Site 1. Concentrations of volatile organic compounds in the buildings were found to be well below the Occupational Safety and Health Act (OSHA) standards.
Sites 3 and 5 - Sampling was not conducted during the SI. Findings for these sites were based on existing reports and information which indicated the presence of Otto Fuel in subsurface soil and groundwater at Site 3 and metals in soil at Site 5. The SI recommended installing monitoring wells at Site 3 and conducting subsurface soil sampling at Site 5.

FY90

Site 8 - This site was added to the RI under the FFA that was signed by the Department of the Navy and the State of Washington, Department of Ecology and EPA.

FY91

SWMUs - A RCRA Facility Assessment (RFA) field investigation was conducted by the State of Washington Department of Ecology. Keyport NUWC has not received an RFA final report.
Site 22 - This site was delineated as a result of a utility duct trench being excavated. Fill materials, including metal piping and shavings, plastic battery casings, bricks, municipal trash and a torpedo, were found and removed during a construction project. Site 22 is immediately adjacent to Site 1 (Keyport Landfill) and it was suspected that the landfill extended further than originally anticipated. No additional debris was found during the SI, therefore, No Further Action (NFA) was determined at Site 22.

FY92

Sites 10-21 - These sites are located at Naval Ordnance Center (NOC) Port Hadlock and are no longer a part of Keyport NUWC.
Site 8 - A removal action was completed. An underground trench and several sumps were excavated and chromium-contaminated soil was removed and replaced with clean fill.

KEYPORT NUWC
HISTORICAL PROGRESS

FY93

Sites 7 and 22 - An SI was completed at these two sites. Site 7 was addressed in the IAS, but was determined not to pose a threat to human health or the environment and was not recommended for further investigation. Soil and groundwater contaminated with chlorinated solvents were discovered during military construction projects that were conducted in the area. The SI showed contamination below background levels, therefore, NFA is recommended.
Sites 2, 3, 5, 8 and 9 - An RI/FS was completed.

FY94

Sites 2, 3, 5, 8 and 9 - A Record of Decision (ROD) was signed for OU 2. NFA was determined for Site 3. The ROD specifies confirmational sampling to be conducted at Sites 5 and 9, and long-term monitoring for Sites 2 and 8. In addition, the ROD requires a soil removal to occur in two phases at Site 8.
Site 23 - Interim Corrective Measures (tanks filled with concrete) was completed for eight tanks.

FY95

Site 1 - Some temporary buildings located above the landfill at Site 1 were vacated and removed as a precautionary measure.
Sites 2, 5, 8 and 9 - Confirmational sampling and monitoring workplans were finalized.
Site 8 - Phase I of Area 8 a RA was conducted.
Site 23 - A Corrective Action consisting of removal and closure, began. Site 23 consists of hazardous waste storage tanks and sumps. Probable contaminants include solvents and petroleum products.

FY96

Site 1 - Pre-ROD sampling and additional GW analysis was conducted.
Site 8 - Work plans for the Phase II soil removal began were started. Completed two IRAs. LTM of groundwater, sediments and tissues began.
Site 2 and 8 - LTM of gGroundwater monitoring and evaluation began.
Site 2. - Complete RI/FS. Response complete.Sites 5 and 9 - Response complete. Completed one-time confirmational sampling required by ROD for NFA. Completed RA.
Site 23 - Corrective Measures were completed at several tanks. The Corrective Measures consisted of tank and soil removal (RA), and in-situ remediation of contaminated soil.
Site 100 - Conducted a site visit and records search.
UST 1 - Completed removal phase and response complete.

PROGRESS DURING FISCAL YEAR 1997

FY97

Site 2 - Continued LTM of monitoring and evaluating groundwater.
Site 8 - Continued LTM of monitoring and evaluating groundwater.
Finalized workplan for Phase II at plating shop.
UST 23 - AdditionalComplete Corrective Measures were continuedAction Plan for additional tanks.

PLANS FOR FISCAL YEARS 1998 AND 1999

FY98

Site 1 -Draft proposed workplan will be complete. A Supplemental RI Report and a Focused FS were developed. Sign ROD. Complete RI/FS and RD to begin.
Site 2 - Continue monitoring and evaluating groundwater.
Site 8 - Continue monitoring and evaluating groundwater. Conduct RA Phase II at the plating shop.

FY99

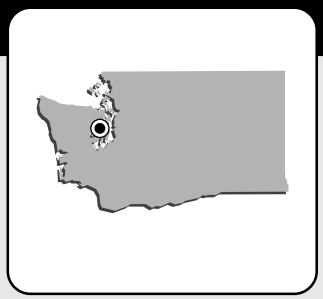
Site 1 - Continue RD and begin RA.
Site 2 - Continue monitoring and evaluating groundwater.
Site 8 - Continue monitoring and evaluating groundwater. Complete RA Phase II at the plating shop.
Site 23 - Achieve Response Complete.

KEYPORT NUWC
PROGRESS AND PLANS

CERCLA	FY96 and before	FY97	FY98	FY99	FY00	FY01	FY02	FY03 and after
PA / SI	10				1			
RI / FS	5		1		1			
RD							1	2
RAC	2							3
RAO								1
IRA	1(2)							
RC	8							3
Cumulative % RC	73%	73%	73%	73%	73%	73%	73%	100%

UST	FY96 and before	FY97	FY98	FY99	FY00	FY01	FY02	FY03 and after
SA	1							
CAP	1							
DES	1							
IMP	1				1			
IMO								
IRA					1(1)			
RC	1				1			
Cumulative % RC	50%	50%	50%	50%	100%	100%	100%	100%

PORT HADLOCK NAVAL ORDNANCE CENTER, PACIFIC DIVISION DETACHMENT
KEYPORT, WASHINGTON



Engineering Field Division/Activity: EFANW
Major Claimant: COMNAVSEASYSCOM
Size: 2,716 Acres
Funding to Date: $6,618,000
Estimated Funding to Complete: $8,192,000

Base Mission: Receives, stores, maintains and issues ordnance

Contaminants: TNT, heavy metals (arsenic, cadium), volatile organic compounds

Number of Sites:	
CERCLA:	18
RCRA Corrective Action:	0
RCRA UST:	0
Total Sites:	18

Relative Risk Ranking of Sites:			
High:	4	Not Evaluated:	0
Medium:	0	Not Required:	13
Low:	1		

NPL

Sites Response Complete: 12

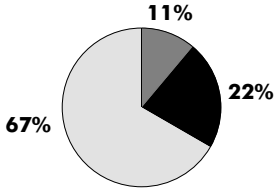
EXECUTIVE SUMMARY

Weapons Support Facility, Port Hadlock DetachmentNOC is located on Indian Island in northeastern Jefferson County, Washington, at the northern end of Puget Sound, near the town of Port Townsend. The primary source of contamination has been from landfills and ordnance disposal. Port Hadlock has served as an ammunition storage and anti-submarine net depot since 1939. Primary contaminants at Port Hadlock NOC are TNT, heavy metals, the chemical additive PCBs, other ordnance compounds such as rRoyal dDemolition eExXposive (RDX), and volatile organic compounds (VOCs). The media affected by these contaminants has been groundwater, surface water and /sediments, and soil. The Navy has changed its operational processes to prevent further contamination.

Environmental investigations since 1984 have focused on cleaning up and preventing future contamination of shellfish beds which are located near the installation. Contaminants can migrate via groundwater and overland flow into the bays or can migrate by soil to the sea-level aquifer. The bays are used for both recreational and commercial fishing. A cCurrent sSituation rReport, completed in FY88, found trace metals (including lead), organics, and petroleum hydrocarbons in shellfish near the north end landfill. A study completed in 1993 found similar results. Sediments have shown no contamination.

Certain areas of Port Hadlock are on the National Register for Historic Places. Sites 10, 11, and 12 have NNative AmericanAmerican archeological concerns because these areas were actively used by NNative AmericanAmerican tribes. Site 10 has large shell deposits called middens that were used for ceremonies. The midden at Site 10 was tested and shown to be over 2,000 years old. Site 11 includes burial grounds. Native AmericanAmerican tTribes have been consulted on cleanup issues at Port Hadlock.

Indian Island is in a rural setting surrounded by Puget Sound and is connected to the main land by two bridges. There are threatened and endangered species in the vicinity. Nine active bald eagle nests are on the Island. Site 21 sits between the island's only two drinking water wells. These wells are no longer used, as water is piped in from Port Townsend. Sites 10, 11, and 12 are adjacent to wetlands. The local community is mostly concerned about the shellfish beds, and groundwater, as many local wells have been impacted by saltwater intrusion.



Current Status Of Sites

Studies Underway	2
Cleanups Underway	4
Response Complete	12
TOTALS	18

Community relations are an ongoing effort. The Community Relations Plan (CRP) was finalized in FY92 and revised in May 1996. A series of fact sheets for the installation cover topics such as state involvement and oversight, the Site Hazard Assessment program, and the results of shellfish and sediment sampling. The Technical Review CommitteeRC was converted to a Restoration Advisory Board (RAB) (RAB) in FY95. There are approximately 30 RAB members from regulatory agencies, local Native American tTribes, and the community. The Navy had an open house for the RAB in July 1995.

In FY87, a removal action was conducted at Site 17. A tank was removed and gas was vented to complete Remedial Action (RA) at this site. An RA has been completed at Sites 13 and 16. Underground Storage Tanks (USTs) were removed at Site 16 in FY91 and tanks and soil were removed at Site 13 in FY91 and FY94. In FY95, soils contaminated with ordnance were removed from Sites 11 and 12 and petroleum contaminated soils were removed from Site 18. A ROD was signed for sites 10, 11, 12, 15, 18, 20, 21 and 22 in August 1996.

In FY96, an Remedial Design (RD) at Site 10 was completed and an RA was begun. This RA involves construction of a landfill cap and a shoreline protection system. The RA will be completed in FY97. Long term groundwater monitoring and shellfish monitoring will follow the RA. At Site 10, a Memorandum of Agreement between the Navy and the National Council of Historic Places was signed for archeological protection during construction. .

An innovative technology, bio-geo-engineering, has been applied to protect the shoreline at Site 10. The bank was eroding and spilling landfill contents onto the beach. Working with Native Tribes and State Agencies such as Department of Wildlife, Department of Natural Resources, and Department of Ecology, this problem has been solved by planting selected vegetation on the bank.

Partnering with regulators and the public allowed the Navy to complete a cleanup at Site 11. After an Interim Removal Action (cleanup of ordnance contaminated soils)the cleanup, it was agreed that no further study would be required, saving over two million dollars. The site has been taken off the Washington State Hazardous Sites List.

Groundwater compliance monitoring at Sites 10, 12 and 21 will be continued in FY 97.

PORT HADLOCK NOC PAC DIV DET
RELEVANT ISSUES

ENVIRONMENTAL RISK

HYDROGEOLOGY - The aquifer at Site 21 is very deep and flat. It is over 150 feet deep. The groundwater at Site 34 has been found to be a perched aquifer about 20 feet deep. Surface runoff goes to the bay, which supports commercial shellfish beds. Sites 10, 11, 12, and 18 are near the shoreline. The landfill sits partially below sea level. It has been shown that contaminants transport via groundwater to the shellfish beds off Site 10. Two drinking water wells near Site 21 are not used and have not been sampled for many years. Contaminants can migrate via surface and groundwater on Indian Island. Surface runoff does not follow defined channels but flows overland into the bays surrounding the island. These bays are used for recreational and commercial fishing. Contaminants can also migrate to the sea level aquifer. The primary water supply for Indian Island is imported via a pipeline from Port Townsend. ,H however, two backup wells are maintained that tap the sea level aquifer are maintained. These wells are near Site 21. They have not been used or sampled for many years.. Because of the tides, some of the Port Hadlock sites can only have cleanup activities scheduled for certain times of the year.

NATURAL RESOURCES - Several beaches around Port Hadlock are productive shellfish propagation areas. A Current Situation Report, completed in FY88, found trace metals, including lead, organics, and petroleum hydrocarbons in shellfish near Site 10 (North End Landfill). Threatened or endangered bird species in the Port Hadlock area include the bald eagle, the American Peregrine Falcon, and the Aleutian Canadian Goose. Site 11 (Walan Point) is adjacent to a bird sanctuary and a wetland that provide habitats for threatened and endangered species.

RISK - Four sites at Port Hadlock (Sites 10, 11, 12, and 21) received a high relative risk ranking using the DOD Relative Risk Ranking System. Site Evaluation Model. All of these sites have groundwater contamination. The landfill site, (Site 10), also has contaminants in sediments. Receptors are human and ecological, threatened and endangered species. There is evidence of unacceptable risk from eating shellfish harvested from the wetlands and shoreline areas which are adjacent to the landfill. Sites 11 and 12 are former ordnance disposal areas. Site 11 is also adjacent to wetlands and shoreline areas. Site 21 was used as a disposal site in the 1940's. Soils contaminated with ordnance were was removed from Sites 11 and 12 in FY94. Soil containing metallic refuse and other debris was removed from Sites 11 and 12 in FY95. Remedial action involving a landfill cap at Site 10 waswill be completed in FY97. Site 10 will also have a shoreline protection system and groundwater and shellfish monitoring. The Agency for Toxic Substances and Disease Registry (ATSDR) completed a Public Health Assessment in 1995. Recommendations were made for further shellfish monitoring. No immediate concerns were found.

RESTORATION PROJECTS - Removal actions at Site 11 (Walan Point) included salvaging and transplanting selected native plants to twelve capillary beds. The beds were maintained and watered on a regular basis throughout the removal actions. In addition, seeds of selected native species (shrubs and herbs) from areas within and adjacent to the construction zone at Site 11 were collected, cleaned, and dried. After all removal actions were completed at Site 11 and Site 12 (Griffin Street), a successful vegetative restoration program was conducted. An innovative technology, bio-geo-engineering, has been applied to protect the shoreline at Site 10. The bank was eroding and spilling landfill contents onto the beach. Working with Native Tribes and Sstate Aagencies such as Department of Wildlife, Department of Natural Resources, and Department of Ecology, this problem has been solved by planting selected vegetation on the bank.

REGULATORY ISSUES

NATIONAL PRIORITIES LIST - Port Hadlock was listed on the National Priorities List (NPL) in June 1994 based on a Hazard Ranking System (HRS) score of 50.00. The landfill at Site 10 has contributed to contamination of the surrounding beaches through erosion and groundwater. It is a critical site and contributed heavily to the NPL scoring.

LEGAL AGREEMENTS - An Interagency Agreement (IAG) was negotiated and signed in August 1996 between the Navy, State of Washington, and EPA Region X.

PARTNERING - Partnering with regulators and the public allowed a fast cleanup at Site 11, precluding the need for an RI/FS. This saved the Navy over two million dollars. The site was listed as no further action in the record of decision (ROD) signed in August 1995. Also, the State of Washington removed Site 11 from the Washington State Hazardous Sites List.

COMMUNITY INVOLVEMENT

RESTORATION ADVISORY BOARD - A Ttechnical Rreview Ccommittee (TRC) was formed in 1988. The TRC was converted to a Rrestoration Aadvisory Bboard (RAB) in July 1995. There are 30 RAB members from regulatory agencies, local Native American tribes, and the community. The RAB meets quarterly.

COMMUNITY RELATIONS PLAN - The Ccommunity r Relations pPlan (CRP) was finalized in FY92 and was revised in May 1996. A series of fact sheets for the installation cover topics such as state involvement and oversight, the Site Hazard Assessment program, and the results of shellfish and sediment sampling.

INFORMATION REPOSITORY - The Administrative Record was established in the 1980's. An Information Repository, containing copies of the Administrative Record documents, is available to the public at the Jefferson County Library in Port Hadlock.

HISTORICAL PROGRESS

FY79-FY90

Site 10 - The SI was completed. Trace metals (including lead), organics, and petroleum hydrocarbons were found in soil, sediment, and shellfish. An RI/FS was recommended.
Site 17 - A tank was removed and field monitoring of explosive gas concentrations was completed. The RA was completed and involved the installation of piping and fans to vent the methane gas in the tank, which reduced methane gas levels to below explosive level.
Site 21 - An SI was completed. Halogenated hydrocarbons and polynuclear aromatic hydrocarbon were found in the soil. An RI/FS was recommended.

FY91

Sites 10,11, 12, 15, 18-20, 21, and 22 - The State of Washington Department of Ecology issued an Enforcement Order for NOC Port Hadlock. The state's primary concerns involved ordnance contamination at sites that were not recommended for further action in the PA. As a result of negotiations between the Department of the Navy and the State of Washington, a Site Hazard Assessment (equivalent to an SI) was conducted for these sites.
Site 13 - One 3,000 gallon tank leaked; less than 500 gallons were lost and the tank was repaired. Later that year, the same tank failed a precision tightness test. The RA consisted of tank removal and removal of petroleum contaminated soils. The soils were landfarmed on site to reduce levels to below regulatory limits.

Port Hadlock NOC PAC DIV DET
HISTORICAL PROGRESS

Sites 15, 19, 20 and 22 - These sites were recommended for no further action.
Site 16 - Removal action of the underground storage tanks was completed.
Sites 18 and 20 - It was determined that more extensive sampling and analysis needed to be conducted to further characterize the nature and extent of the contamination before the site would be recommended for an RI/FS.

FY93

Sites 11 and 12 - The SI was completed; and recommended for a removal action and RI/FS.
Site 12 - The SI was completed and recommended for a removal action and RI/FS.
Site 18 - The SI was completed; and a removal action was recommended.
Site 20 - The SI was completed; and recommended for no-further-action (NFA).
Site 30 - The SI was completed at this sites that was identified during construction of a vehicle wash area. Contamination consisting of diesel and heavy oils in soils was verified.

FY94

Site 13 - Steps were taken to prepare the landfarm for closure.
Site 30 - A removal action consisting of removing petroleum contaminated soil and landfilling of the site was completed. No further action is anticipated.
Site 33 - This site was added to the program. An SI is planned.

FY95

Sites 11, 12, and 18 - Interim Removal Action (IRA) was completed. Sites 11 and 12 have Native American archeological concerns. Soil containing metallic refuse and other debris was removed from Sites 11 and 12 and placed at an approved disposal facility. Site 18 was a catch basin for drain pipes and contained sediments contaminated with Ppolynuclear Aaromatic Hhydrocarbons (PAHs). These sediments were removed. Compliance monitoring at these three sites began to determine if the confirm effectiveness of removal action was effective.. A ROD was signed in August listing these sites as No Further Action (NFA). Monitoring was completed for Sites 11 and 18. An RI/FS was not required for Site 11.
Sites 10 and 21 - A Record of Decision (ROD) was signed in August 1995. This ROD presents the selected remedial action for Sites 10 and 21. The landfill at Site 10 has contributed to contamination of the surrounding beaches through erosion and groundwater. It is a critical site and contributed heavily to the NPL scoring. The site is eligible for the National Register for Historical Places. Remedial action will include capping the landfill and installing a shoreline protection system along the perimeter of the landfill to keep landfill contents from eroding onto the beach. This shoreline protection system will incorporate bio-geo-engineering techniques. The ROD specifies groundwater monitoring for two years at Site 21, and old fill area, to determine whether the detections of certain chemicals in the groundwater during the RI were anomalous.
Site 34 - A new site was identified. Site 34 is an Open Burn/Open Detonation Area. A Site Inspection (SI) began to determine the extent of contamination at this new site.
Sites 11, 12, 15, 18, 20, and 22 - An NFA ROD was signed in August 1995.

FY96

Site 10 - RD was completed and the. RA was begun (will begin of landfill cap and shoreline protection system). An innovative technology, bio-geo-engineering, has been designed to protect the shoreline. The bank was eroding and spilling landfill contents onto the beach. This problem has been solved by planting selected vegetation on the bank. A Memorandum of Agreement between the Navy and the National Council of Historic Places was signed for archeological protection during construction.
Site 11 - Compliance monitoring was completed. Response Complete.
Site 12 - Compliance monitoring continued. at this site.
Site 21 - Two years of groundwater monitoring began, as specified in the ROD.
Site 34 - The SI was completed and RD and removal action initiated.
Sites 10, 11, 12, 15, 18, 20, 21, and 22 - An Interagency Agreement was signed in August 1996 between the Navy, EPA Region X and Washington State.

PROGRESS DURING FISCAL YEAR 1997

FY97

Site 10 - RA waswill be completed. Marine Monitoring Plan and O&M Plan completed. Long term groundwater monitoring and shellfish monitoring will begin following construction of cap and shoreline protection system.
Site 12 - Compliance monitoring completed.
Site 21 - Groundwater monitoring completed., as specified in the ROD signed in 1995, should be completed, and this is expected to be the final RA.
Site 34 - Completed SI and RA. Response Complete.Planned SI.
Sites 33 and 35 - Planned SI and RA. Site 33 is an abandoned rifle range. Site 35 is an old paint storage area. Completed SI, RI/FS, and RD. Response Complete and site is No FFurther Action.
Site 35 - Completed SI, Response Complete and site is No Further Action.
Site 36 - New site identified (laydown area).

PLANS FOR FISCAL YEARS 1998 AND 1999

FY98

Site 10 - Begin long term groundwater and shellfish monitoring. Continue O&M.
Site 12 - Anticipate to be NFA.Groundwater and shellfish performance sampling will continue.
Site 21 - Complete IRA and RA.Anticipate to bed NFA.
Site 33 - Anticipated RA completed with NFA agreement.
Site 35 - **Complete SI and RA.Site 36** - Begin SI.

FY99

Site 10 - Continue long term monitoring and O&M.
Site 11 - Complete RA, LTO, and RC site.
Site 12 - Complete RA. RC site.
Site 21 - Complete LTO and RC site.
Sites 34 and 36 - Complete SI RIFS and begin RD.

PORT HADLOCK NOC PAC DIV DET PROGRESS AND PLANS

CERCLA	FY96 and before	FY97	FY98	FY99	FY00	FY01	FY02	FY03 and after
PA / SI	14	3						
RI / FS	5	1		2				
RD	5	1						
RAC	4	2	1	2	1			
RAO	1			2	2			1
IRA	7(8)		1(1)		3(3)			
RC	10	2		3	2			1
Cumulative % RC	56%	67%	67%	83%	94%	94%	94%	100%

PUGET SOUND FLEET AND INDUSTRIAL SUPPLY CENTER BREMERTON
PUGET SOUND, WASHINGTON

Engineering Field Division/Activity: EFANW
Major Claimant: COMNAVSUPSYSCOM
Size: 29 Acres
Funding to Date: $19,285,000
Estimated Funding to Complete: $2,078,000

Base Mission: Procures equipment and services for naval activities

Contaminants: Heavy metals, scrap metal, PCBs

Number of Sites:

CERCLA:	1
RCRA Corrective Action:	0
RCRA UST:	0
Total Sites:	1

Relative Risk Ranking of Sites:

High:	1	Not Evaluated:	0
Medium:	0	Not Required:	0
Low:	0		

Sites Response Complete: 0

PROGRESS AND PLANS

CERCLA	FY96 and before	FY97	FY98	FY99	FY00	FY01	FY02	FY03 and after
PA / SI	1							
RI / FS		1						
RD			1					
RAC				1				
RAO					1			
IRA	1(1)			1(1)				
RC					1			
Cumulative % RC	0%	0%	0%	0%	100%	100%	100%	100%

PUGET SOUND FLEET AND INDUSTRIAL SUPPLY CENTER MANCHESTER
PUGET SOUND, WASHINGTON

Engineering Field Division/Activity: EFANW
Major Claimant: COMNAVSUPSYSCOM
Size: 234 Acres
Funding to Date: $223,000
Estimated Funding to Complete: $2,649,000

Base Mission: Supplies fuels and lubrication oils to fleet and shore activities

Contaminants: PCBs, heavy metals, POLs

Number of Sites:
CERCLA: 2
RCRA Corrective Action: 0
RCRA UST: 2
Total Sites: 4

Relative Risk Ranking of Sites:
High: 1
Medium: 0
Low: 2
Not Evaluated: 1
Not Required: 0

Sites Response Complete: 0

PROGRESS AND PLANS

CERCLA	FY96 and before	FY97	FY98	FY99	FY00	FY01	FY02	FY03 and after
PA / SI	1	1						
RI / FS			2					
RD	1							
RAC								1
RAO								
IRA				1(1)				
RC			1					1
Cumulative % RC	0%	0%	50%	50%	50%	50%	50%	100%

UST	FY96 and before	FY97	FY98	FY99	FY00	FY01	FY02	FY03 and after
SA	1		1					
CAP			2					
DES								
IMP				1				
IMO								
IRA								
RC			1	1				
Cumulative % RC	0%	0%	50%	100%	100%	100%	100%	100%

PUGET SOUND NAVAL HOSPITAL BREMERTON
BREMERTON, WASHINGTON

Engineering Field Division/Activity: EFANW
Major Claimant: BUMED
Size: 48 Acres
Funding to Date: $0
Estimated Funding to Complete: $0

Base Mission: Provides clinic and hospital services; originally used for ammunition storage and ordnance demilitarization

Contaminants: Solvents, heavy metals, POLs

Number of Sites:	
CERCLA:	0
RCRA Corrective Action:	0
RCRA UST:	1
Total Sites:	1

Relative Risk Ranking of Sites:			
High:	0	Not Evaluated:	0
Medium:	0	Not Required:	0
Low:	1		

Sites Response Complete: 0

PROGRESS AND PLANS

UST	FY96 and before	FY97	FY98	FY99	FY00	FY01	FY02	FY03 and after
SA								
CAP								
DES								
IMP								1
IMO								
IRA		1(1)						
RC								1
Cumulative % RC	0%	0%	0%	0%	0%	0%	0%	100%

PUGET SOUND NAVAL SHIPYARD
BREMERTON, WASHINGTON

Engineering Field Division/Activity: EFANW
Major Claimant: COMNAVSEASYSCOM
Size: 1,392 Acres
Funding to Date: $50,671,000
Estimated Funding to Complete: $51,592,000

Base Mission: Provides logistic support for assigned ships and service craft; performs authorized work in connection with construction, overhaul, etc.

Contaminants: Heavy metals, grit, paint, solvents, construction debris, acids, silver nitrate

Number of Sites:		Relative Risk Ranking of Sites:			
CERCLA:	17	High:	15	Not Evaluated:	0
RCRA Corrective Action:	0	Medium:	0	Not Required:	18
RCRA UST:	16	Low:	0		
Total Sites:	33				

NPL

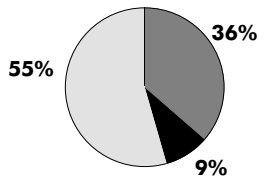
Sites Response Complete: 18

EXECUTIVE SUMMARY

The Puget Sound Naval Shipyard (PSNSY) is located across the Sound, west of Seattle, Washington. The shipyard sits on a peninsula that is bordered on the south, east, and north by various bays and inlets of Puget Sound. PSNSY is bordered to the north by the City of Bremerton. The majority of the PSNSY is built on contaminated fill material. This fill material acts as a continuing source of contaminants.

Jackson Park Housing and the Naval Complex were originally included in the Naval Submarine Base Bangor Initial Assessment Study (IAS) but have since been moved into the PSNSY Installation Restoration Program (IRP) due to a change in ownership. The entire eastern edge of Jackson Park and Naval Hospital consists of shoreline (tide flats). The base is located directly on Ostrich Bay, which is part of Dyes Inlet. The main sources of contamination at Jackson Park are related to past operations. Ammunition and fuel oil were stored and handled, dry waste powders were collected and burned along the northern shore, liquid ammunition wastes were collected into an ammunition recovery system and were also washed into floor drains during daily cleaning of the industrial buildings. The wastewater drained directly to Ostrich Bay. The Navy has changed its operational processes to prevent further contamination. All sites at PSNSY and Jackson Park were evaluated in scoring the sites for inclusion on the National Priorities List (NPL). Both PSNSY and Jackson Park Housing were listed on the NPL in May 1994.

PSNSY and Jackson Park had Technical Review Committees (TRCs) that were converted to Restoration Advisory Boards (RABs) in September 1994. The RABs held their first meetings in October 1994. The RABs meet monthly and membership includes Native American Tribes in the local area, community representatives, regulatory agencies, and the Navy. Both RABs were actively involved in an Environmental Cleanup Information Fair in May 1995 at the Kitsap Regional Library. Visual and hands on displays described the cleanup work at PSNSY and Jackson Park. RAB members and regulators, including the Agency for Toxic Substances and Disease Registry (ATSDR), answered questions and distributed handouts.



Current Status Of Sites

Studies Underway	12
Cleanups Underway	3
Response Complete	18
TOTALS	33

Sampling and analysis of soils was conducted during 1995 at sites comprising Operable Unit B (OU B) to gain further understanding of the cleanup required in the industrial and marine areas of PSNSY. Also, 200 sea cucumbers were collected from Sinclair Inlet and Rich Passage for physical and chemical analysis. The sea cucumbers collected from Rich Passage were used as a baseline for reference. Rich Passage is open to harvesting and 45 tons are harvested annually. The information collected will be used during the Remedial Investigation/Feasibility Study (RI/FS). Sampling of waters discharging to the bay were conducted at Jackson Park Site 101 and 103. Elevated levels of benzene were found at one sample location.

PSNSY and Jackson Park have taken steps to accelerate cleanups and facilitate discussions with the regulators and other agencies. Both installations have a Memorandum of Understanding with the U.S. Geological Survey (USGS). USGS provides technical support and has conducted a detailed study of the Puget Sound drydock system to determine the effect the docks may have on groundwater flow.

An innovative technology in use at PSNSY is steam sparging. Two 4.9 million gallon concrete underground storage tanks (USTs) leaked large amounts of Bunker C oil into the subsurface environment. Steam sparging, which entails the injection of steam into the ground to lower the viscosity of the contaminant, allows the product to be drawn to extraction wells for removal and recycling. This technology will eliminate an extensive RI/FS at the site. Community members are very appreciative of this simple yet cost-effective measure to reduce hazardous wastes in Puget Sound.

PUGET SOUND NSY
RELEVANT ISSUES

ENVIRONMENTAL RISK

HYDROGEOLOGY - Direct recharge from precipitation is the major source of water to the aquifer groundwater system in the PSNSY area. Because there are no major streams in the area, all water from precipitation must either run-off to storm sewers, return to the atmosphere, or percolate to the water table. All groundwater must either discharge directly to Sinclair Inlet, to springs along the shoreline, or to the drydock at the Shipyard. The shipyard and the entire area surrounding it are served by public water systems. There are few wells in the area other than the monitoring wells at PSNSY. Similarly, Jackson Park Housing Complex and Naval Hospital are served by public water. Direct recharge from precipitation is the major source of water to the aquifer. There is a small stream that passes through the base during the winter, but dries up in the summer. All storm water discharges into Ostrich Bay via surface water runoff, as groundwater that seeps along the beach, or through the storm water system.

NATURAL RESOURCES - Water is the predominant natural resource in the area. Sinclair Inlet and Ostrich Bay are rated as Class A (Excellent) bodies of water according to the State of Washington. Under this classification, water uses to be protected include anadromous salmon migration and rearing, commercial fish and shellfish reproduction and harvesting, boating, fishing, aesthetics and water contact recreation, industrial water supply and navigation. The only known federal endangered species in Kitsap County are the bald eagle and spotted owl.

The ecological risk assessment for PSNSY OU B suggests that risks evaluated from sediment chemistry are overestimated. Direct measure of marine organisms shows risk to be low to moderate. No ecological risk assessment has been developed for Jackson Park.

RISK - Baseline Human Health Risk Assessments have been completed for all OUs at PSNSY. Marginal risk exists from exposure to soils. This risk is being reduced by paving the sites. A risk exists for eating fish and shellfish collected from Sinclair Inlet. The State currently recommends not collecting shellfish from Sinclair Inlet. Fishing is not restricted at this time.

Eighteen sites at PSNSY have received a high relative risk ranking in the DOD Relative Risk Ranking System. Many of these sites are in close proximity to the Sinclair Inlet. Groundwater contaminated with heavy metals, the chemical additive PCB, and battery acids, discharges into Sinclair Inlet. Receptors include marine fauna, shellfish, and sediment burrowing organisms that may then result in uptake through the food chain. Native Americans have fishing rights to the Sinclair Inlet.

Currently at PSNSY, terrestrial risk is being reduced by paving all sites and establishing a protocol for excavations within sites when necessary for utility work and repairs.

The risks from Jackson Park and Naval Hospital are primarily attributed to shellfish consumption. There is an additional risk from soil intake in a lifetime exposure. Four sites at Jackson Park have a high relative risk ranking. Previous to becoming a military residence, operations in the Jackson Park area, along the shoreline of Ostrich Bay, included ordnance production and demilitarization. Liquid wastes were generated when ordnance production areas were washed down. Wastewater was discharged directly into Ostrich Bay. Ecological receptors are shellfish. Analytical results for surface water showed concentration of metals. Analytical results for marine sediments showed detectable concentrations of Semi-Volatile Organic Compounds (SVOCs), ordnance and metals. The close proximity of the groundwater to the shoreline provides an additional potential pathway to sediments. Recently discovered benzene in seeps may be of potential concern.

The Agency for Toxic Substance and Disease Registry (ATSDR) conducted site visits in February 1993 at PSNSY and in November 1993 at Jackson Park for the purpose of gathering information used in the preparation of a Public Health Assessment. Site summaries and site rankings were provided by ATSDR in June 1994. PSNSY received a "D" ranking and Jackson Park received a "C" ranking. Both rankings indicate a low priority for a full health assessment.

REGULATORY ISSUES

NATIONAL PRIORITIES LIST - All sites at PSNSY and Jackson Park were evaluated in scoring the sites for inclusion on the National Priorities List (NPL). Both PSNSY and Jackson Park Housing were listed on the NPL in May 1994. The Hazard Ranking System (HRS) score for both activities was 50.00.

LEGAL AGREEMENTS - A Federal Facilities Agreement (FFA) is not planned for PSNSY or Jackson Park at this time. A Record of Decision was signed in January, 1997 for PSNS OU A, and an IAG is currently being negotiated. The shipyard applied for a RCRA Part B permit. As a result, a RCRA Facility Assessment (RFA) for PSNSY was finalized by EPA Region X, and received by the Department of the Navy in December 1992. The facility is still in Interim Status and in August 1995 filed an updated Part B permit application with the state. No corrective actions have been initiated at this time and it is anticipated that CERCLA actions will accomplish any corrective actions necessary. All Jackson Park sites are being handled under CERCLA. Jackson Park is a housing area and does not have a RCRA permit or any RCRA associated activities ongoing.

The following sites have been associated with the following Operable Units:
OU A-Site 3
OU B-Sites 1,2,6,7,8,9,104,105,106.
OU C-Sites 11
OU 1-Sites 101,102,103 JACKSON PARK
OU 2-Sites 101,102,103 JACKSON PARK (MARINE PORTION)

COMMUNITY INVOLVEMENT

RESTORATION ADVISORY BOARD - Jackson Park formed its Technical Review Committee (TRC) in FY91. PSNSY formed its TRC in FY92 and the group met quarterly. Both TRCs enabled the Navy to involve the regulatory agencies in scoping phases of studies and decision-making. The TRCs were converted to Restoration Advisory Boards (RABs) in September 1994. The RABs held their first meetings in October 1994. The RABs meet monthly and membership includes Native American Tribes in the local area, community representatives, regulatory agencies, and base personnel. Board members include a fishing specialist for the Tribes, a representative from the National Oceanic and Atmospheric Administration and a health specialist.

Both RABs were actively involved in an Environmental Cleanup Information Fair in May 1995 at the Kitsap Regional Library. Visual and hands on displays described the cleanup work at the Shipyard and Jackson Park. RAB members and regulators, including the Agency for Toxic Substances and Disease Registry (ATSDR), answered questions and distributed handouts.

COMMUNITY RELATIONS PLAN - In FY92, a Community Relations Plan (CRP) for Jackson Park was completed. A CRP was completed for PSNSY in early FY93. Both CRPs were updated in FY95 to include the NPL status of the facilities and reflect the formation of the RABs.

INFORMATION REPOSITORY - The Administrative Record for PSNSY and Jackson Park is maintained at EFA Northwest in Poulsbo, Washington. Information Repositories for PSNSY were established in 1992 at the three branches of the Kitsap Public Library (Downtown and Central Branches) and the Port Orchard Library. Four Information Repositories were established in 1992 for Jackson Park, one at each of the three branches of the Kitsap Public Library and one at the Jackson Park Community Center.

Puget Sound NSY
HISTORICAL PROGRESS

FY83

Sites 1-11 - An Initial Assessment Study(IAS), equivalent to a Preliminary Assessment (PA), identified six potentially contaminated sites at Naval Shipyard (NSY) Puget Sound. A supplemental PA in FY90 identified an additional five potentially contaminated sites. Of these sites, nine were recommended for further investigation.
Sites 101-108 - A draft IAS was completed at Jackson Park Housing and identified eight sites. Two sites (Sites 101 and 103) were recommended for further investigation, six sites (Sites 102, 104-108) were recommended for No Further Action (NFA).

FY88

Sites 101, 102 and 104-108 - A PA was completed for these sites.
Sites 101 and 103 - A Current Situation Report, equivalent to a Site Inspection (SI) for Jackson Park Housing was completed. The SI found low concentrations of picramic acid, and the following volatile and semi-volatile organic compounds: phthalate, methylene chloride, and trichloroethylene in surface water. Also found were elevated levels of picramic acid and phthalates in shellfish and fish tissue. Elevated levels of heavy metals (copper, lead, and zinc) were detected in surface water, but these levels may be related to existing residential storm water contributions and not to previous installation activities. The SI recommended further investigation of Sites 101 and 103. After completion of the SI, Site 101 was divided into two sites: Ordnance and Wastewater Discharges (Site 101) and South Jackson Park Beach (Site 101A).

FY90

Site 6 - The SI was completed.
Sites 1-6 - A supplemental PA was completed for these sites.
Sites 7-11 - The supplemental PA identified these five new sites.
Sites 1, 3 and 6-11 - These eight sites were recommended for an SI due to suspected soil, sediment, and groundwater contamination
Sites 4 and 5 - Recommended for No Further Action (NFA). The sites pose no threat to human health or the environment.

FY92

UST 1 - An Underground Storage Tank (UST) Validation Report was prepared. The study identified 26 tanks that are currently abandoned. Nine of the abandoned tanks were removed. Of these tanks, three had leaked extensively.
Sites 1-3 and 7-10 - The SI was completed.
Sites 1-10 - Recommended for an RI/FS.
Sites 1-3 and 6-11 - The State of Washington Department of Ecology issued an Enforcement Order for PSNSY. The Enforcement Order required the Department of the Navy (DON) to complete a Remedial Investigation/ Feasibility Study (RI/FS) and cleanup action plan and to submit proposals for Interim Remedial Action (IRA) alternatives to reduce exposure of on-site workers to contaminated surface soil.

FY93

Site 110 (Jackson Park Uplands) - An SI was completed. Site 110 consists of a consolidation of Sites 102, 104, 105, 106, 107 and 108. The sites comprising Site 110 were reinvestigated as a result of a February 1992 Enforcement Order issued by the State of Washington, Department of Ecology.
Sites 101, 101A, 103 and 115 - The Enforcement Order also required that an RI/FS be conducted at Sites 101, 101A, 103 and 115. Site 115 consisted of the marine waters, sediment, and biota that have been contaminated with hazardous substances as a result of past site activities; this site has since been incorporated into Sites 101, 101A and 103.

FY94

Site 2 - A removal action was completed to remove soil contaminated with lead, the chemical additive PCB, mercury, and TPH. The soil was excavated and disposed of off-site at an approved disposal facility.
Site 102 (South Jackson Park) - A 100,000 gallon tank, a smaller tank, and the surrounding soil were removed to mitigate visible oil seepage along South Jackson Park Beach, which may have resulted from leaks from the tank or its associated piping.
Site 110 - Two soil removal actions have been completed. During the removal, additional contamination was found. Soil excavated from Site 110 has been thermally treated.
UST 1 - Five tanks were removed. There was no evidence of leakage and no further action is required. Remaining abandoned tanks were removed or closed. All of the 26 tanks identified were included in the 16 sites.

FY95

OU A (Site 3) - RI/FS was completed.
Site 6 - In the waters of the Puget Sound, divers from PSNSY removed a considerable amount of hazardous debris, compressed cylinders, paint cans, and other assorted wastes.
OU B (Sites 104, 105 and 106) - Sampling and analysis of soils was conducted to gain further understanding of the cleanup required in the industrial area of PSNSY. The presence of the chemical additive PCB and arsenic was evaluated. Also, 200 sea cucumbers were collected from Sinclair Inlet and Rich Passage for physical and chemical analysis. The sea cucumbers collected from Rich Passage were used as a baseline for reference. Rich Passage is open to harvesting and an average of 45 tons are harvested annually. The information collected will be used to complete the Remedial Investigation/Feasibility Study (RI/FS).
Sites 101, 102, 103 (Jackson Park Housing) - Soil and groundwater sampling and analysis was conducted. Remedial Investigation (RI) was completed.
Site 11 - An Innovative Technology Demonstration Program involving steam sparging was used to heat the Bunker C fuel that has contaminated soils and groundwater and then mobilize the fuel to points where it can be pumped and removed. The SI for Site 11 was completed.
Site 110 - Soil excavated was thermally treated.
UST Tanks - Negotiations with State regulators identified additional action on five tanks.

FY96

Sites 101-103 (Jackson Park Housing) - Feasibility Study is in review for OU1 and OU2.
OU A (Site 3) - Ongoing RI/FS. Initiated RA work plans and preparing decision documents.
OU B(Sites 1, 2, 6, 7, 8, 9 and 104-106) - Ongoing RI/FS at OU-B. The primary objective is to determine impacts on Sinclair Inlet from upland sources.
OU C (Site 11) - RA is on-going. Recovery of free-product (Bunker C and diesel fuel) using steam sparging demonstration has been successful. RA initiated on five tanks.

Puget Sound NSY
PROGRESS DURING FISCAL YEAR 1997

FY97

OU A (Site 3) - ROD signed Jan, 1997. RD ongoing.
OU B - WA Dept. of Ecology reviewed the Draft RI from SEP 96 to SEP 97.
OU C - Validation of steam sparging demonstration was completed.
Sites 101, 102 and 103 (Jackson Park Housing) - RI/FS completed.
OU 1 (Site 106) - Included in OU 1 RI.
Sites 7, 11 and 103 - IRAs completed.
USTs 1, 2, 9, 14, 16 and 17 - IRAs completed.
USTs 1, 2, 9, 12, 14, 16 and 17 - IMP completed.
USTs 1, 2, 9, 12, 14, 16 and 17 - Response Complete.

PLANS FOR FISCAL YEARS 1998 AND 1999

FY98

Sites 11, 102 and 103 - Finalize the RI/FS. Begin writing the proposed plan and ROD.
OU A (Site 3) - Complete RD.
OU C - RA ongoing. Expansion of steam sparging facility to full scale recovery system affecting a greater area of contamination.
Site 1 - Complete PASI.
Site 3 - Complete RD.
Site 102 - Complete RAC and RC site.

FY99

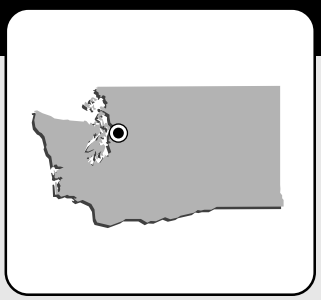
OUs 1 and 2 - Begin RD and RA.
OU A - RA will be completed and LTM started.
OU B - ROD will be completed and RD started.
OU C - Continue OandM of steam sparging system.
Sites 1, 2, 6-9 and 104-106 - Complete RIFS.
Sites 102 and 110 - Complete RD.
Sites 1, 11, 105 and 106 - Complete IRA.

PROGRESS AND PLANS

CERCLA	FY96 and before	FY97	FY98	FY99	FY00	FY01	FY02	FY03 and after
PA / SI	16		1					
RI / FS		3	3	9				
RD			1	2	11		1	
RAC			1		1	9	2	2
RAO								12
IRA	8(8)	3(3)		4(4)	2(2)		2(2)	
RC	2		1				2	12
Cumulative % RC	12%	12%	18%	18%	18%	18%	29%	100%

UST	FY96 and before	FY97	FY98	FY99	FY00	FY01	FY02	FY03 and after
SA								
CAP	2							
DES								
IMP	9	7						
IMO								
IRA	16(18)	6(6)						
RC	9	7						
Cumulative % RC	56%	100%	100%	100%	100%	100%	100%	100%

PUGET SOUND NAVAL STATION
PUGET SOUND, WASHINGTON



Engineering Field Division/Activity: EFANW
Major Claimant: COMNAVFACENGCOM
Size: 151 Acres
Funding to Date: $1,193,000
Estimated Funding to Complete: $0

Base Mission: Closed; NAVFAC is caretaker until transfer. Previously maintained and operated facilities and provided services and materials support for Navy operations forces and tenant shore activities

Contaminants: PCBs, pesticides, volatile and semi-volatile organic compounds

Number of Sites:

CERCLA:	8
RCRA Corrective Action:	0
RCRA UST:	3
Total Sites:	11

Relative Risk Ranking of Sites:

High:	0	Not Evaluated:	0
Medium:	0	Not Required:	11
Low:	0		

BRAC II

Sites Response Complete: 11

PROGRESS AND PLANS

CERCLA	FY96 and before	FY97	FY98	FY99	FY00	FY01	FY02	FY03 and after
PA / SI	8							
RI / FS								
RD								
RAC								
RAO								
IRA								
RC	8							
Cumulative % RC	100%	100%	100%	100%	100%	100%	100%	100%

UST	FY96 and before	FY97	FY98	FY99	FY00	FY01	FY02	FY03 and after
SA	3							
CAP								
DES	1							
IMP	1							
IMO								
IRA	1(1)							
RC	3							
Cumulative % RC	100%	100%	100%	100%	100%	100%	100%	100%

PUGET SOUND NAVAL STATION EVERETT
EVERETT, WASHINGTON

Engineering Field Division/Activity: EFANW
Major Claimant: CINCPACFLT
Size: 116 Acres
Funding to Date: $545,000
Estimated Funding to Complete: $5,789,000

Base Mission: Services a seven-ship carrier battle group
Contaminants: POLs, heavy metals

Number of Sites:
CERCLA: 2
RCRA Corrective Action: 0
RCRA UST: 2
Total Sites: 4

Relative Risk Ranking of Sites:
High: 1
Medium: 0
Low: 3
Not Evaluated: 0
Not Required: 0

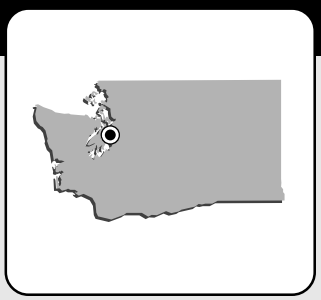
Sites Response Complete: 0

PROGRESS AND PLANS

CERCLA	FY96 and before	FY97	FY98	FY99	FY00	FY01	FY02	FY03 and after
PA / SI	1							
RI / FS					1			
RD				1				1
RAC				1				1
RAO								1
IRA								1(1)
RC				1				1
Cumulative % RC	0%	0%	0%	50%	50%	50%	50%	100%

UST	FY96 and before	FY97	FY98	FY99	FY00	FY01	FY02	FY03 and after
SA			1	1				
CAP			1		1			
DES					1			
IMP			1		1			
IMO								
IRA				1(1)				
RC			1		1			
Cumulative % RC	0%	0%	50%	50%	100%	100%	100%	100%

SEATTLE NAVAL RESERVE READINESS CENTER
SEATTLE, WASHINGTON



Engineering Field Division/Activity: EFANW
Major Claimant: COMNAVRESFOR
Size: 5 Acres
Funding to Date: $887,000
Estimated Funding to Complete: $0

Base Mission: Reserve Center
Contaminants: TPH

Number of Sites:
CERCLA: 0
RCRA Corrective Action: 0
RCRA UST: 1
Total Sites: 1

Relative Risk Ranking of Sites:
High: 0
Medium: 0
Low: 1
Not Evaluated: 0
Not Required: 0

Sites Response Complete: 0

PROGRESS AND PLANS

UST	FY96 and before	FY97	FY98	FY99	FY00	FY01	FY02	FY03 and after
SA								
CAP			1					
DES								
IMP			1					
IMO								
IRA								
RC			1					
Cumulative % RC	0%	0%	100%	100%	100%	100%	100%	100%

TACOMA NAVAL AND MARINE CORPS RESERVE CENTER
TACOMA, WASHINGTON

Engineering Field Division/Activity: EFANW
Major Claimant: COMNAVRESFOR
Size: 14 Acres
Funding to Date: $0
Estimated Funding to Complete: $0

Base Mission: Educates, administers, trains, and mobilizes Naval Reservists

Contaminants: POLs

Number of Sites:
- CERCLA: 0
- RCRA Corrective Action: 0
- RCRA UST: 1
- Total Sites: 1

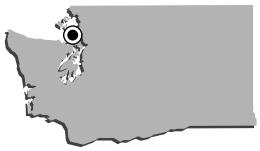
Relative Risk Ranking of Sites:
- High: 0
- Medium: 0
- Low: 0
- Not Evaluated: 0
- Not Required: 1

Sites Response Complete: 1

PROGRESS AND PLANS

UST	FY96 and before	FY97	FY98	FY99	FY00	FY01	FY02	FY03 and after
SA								
CAP								
DES								
IMP	1							
IMO								
IRA	1(1)							
RC	1							
Cumulative % RC	100%	100%	100%	100%	100%	100%	100%	100%

WHIDBEY ISLAND NAVAL AIR STATION
OAK HARBOR, WASHINGTON



Engineering Field Division/Activity: EFANW
Major Claimant: CINCPACFLT
Size: 7,000 Acres
Funding to Date: $67,582,000
Estimated Funding to Complete: $106,824,000

Base Mission: Serves as training and operations center for the A-6 and A-6E Bomber Squadrons; serves as center for U.S. Navy and Marine Corps reserve training in the Pacific Northwest

Contaminants: Chlorinated solvents, PCBs, polynuclear aromatic hydrocarbons

Number of Sites:	
CERCLA:	54
RCRA Corrective Action:	0
RCRA UST:	36
Total Sites:	90

Relative Risk Ranking of Sites:			
High:	8	Not Evaluated:	9
Medium:	2	Not Required:	71
Low:	0		

NPL

Sites Response Complete: *69*

EXECUTIVE SUMMARY

Naval Air Station (NAS) Whidbey Island is located north of Oak Harbor in Island County, Washington. NAS Whidbey occupies four separate areas on Whidbey Island: the Ault Field north of Oak Harbor; the Seaplane Base east of Oak Harbor; the Outlying Field near Coupeville; and the Lake Hancock Target Range. Whidbey Island NAS serves as training and operations center for A-6 and A-6 E bomber squadrons and as a center for U.S. Navy and Marine Corps reserve training in the Pacific Northwest. Operations that contributed to contaminated sites on the base include waste disposal, aircraft maintenance, vehicle maintenance, public works shops, and fire fighting training. Contaminants were found in groundwater, surface water, sediments, and soil. In February 1990, Ault Field and the Seaplane Base were put on the National Priorities List (NPL) due to waste disposal and spill sites. There was also the potential for wastes originating from Ault Field and the Seaplane Base to affect domestic drinking water wells and local shellfish beds. The Federal Facilities Agreement among EPA, the State of Washington Department of Ecology, and the Navy was signed in September 1990. It required the Navy to further investigate Ault Field and the Seaplane Base and evaluate methods for cleanup. Soil excavation activities at the Seaplane Base have sufficiently reduced the threat to human and health and the environment. The EPA removed the Seaplane Base from the National Priorities List on 21 September 1995. The State of Washington removed the Seaplane Base from their Hazardous Sites List on 22 August 1995. This was the first such delisting for the Navy. Construction Complete documentation, a step in the delisting process, for Ault Field was developed and approved in September 1997.

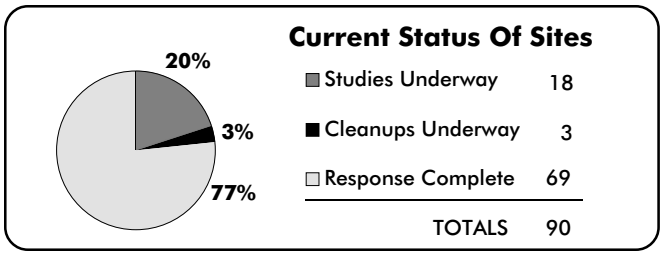
Surface runoff from NAS Whidbey Island discharges directly into the Straits of Juan de Fuca, Dugualla Bay at Ault Field, and into Crescent Harbor and Oak Harbor at the Seaplane Base. The beaches and bays around the island are popular fishing and shellfish gathering areas. A drinking water aquifer for the island underlies the installation and is the primary and sole source of water for most of rural Whidbey Island.

The Community Relations Plan (CRP) was finalized in FY91 and revised in FY95. The Technical Review Committee (TRC) was converted to a Restoration Advisory Board (RAB) in FY94. This was one of the first five RABs within the Navy and Marine Corps. Comments were solicited from the community at an open house. Information Repositories have been established at three local libraries.

The landfill cap at Site 6 was completed in November 1996. Also at Site 6, the pump and treat system to clean groundwater will continue to operate. Bacteriological controls were added to the air stripper to enhance performance. Improved cap design was completed and reduced the risk to human health from contaminants. Site 36, UST 237 was closed in place. At Site 51, a Washington State Hazard assessment of Lake Hancock was initiated.

The Navy has used various innovative concepts on OU 5. They include a qualitative risk assessment, a focused feasibility study (FS), a combined RI/FS document, and a reader's guide to the RI/FS document for the RAB and the community. All four of these innovative concepts expedited the cleanup process in FY95 by streamlining the Navy's efforts and facilitating an efficient RAB review of the RI/FS.

NAS Whidbey Island was recognized for its outstanding environmental cleanup program through the Secretary of Defense (SECDEF) Environmental Cleanup Award. This award represents a major accomplishment and environmental success for NAS Whidbey Island.



WHIDBEY ISLAND NAS
RELEVANT ISSUES

ENVIRONMENTAL RISK

HYDROGEOLOGY - Surface runoff from NAS Whidbey Island discharges directly into the Straits of Juan de Fuca, Dugualla Bay at Ault Field, and into Crescent Harbor and Oak Harbor at the Seaplane Base. An important drinking water aquifer for the island underlies the installation. This aquifer is the primary and sole source of water for most of rural Whidbey Island. Groundwater contamination from a former Navy landfill at Site 6 (OU 1) was migrating off-base and threatening the drinking waterwells of private landowners. An interim remedial action (IRA) addressed the primary risk posed to the public from groundwater contamination by controlling the spread of the contaminated plume of groundwater. The major components of the IRA included extracting groundwater to minimize the plume; treating extracted groundwater using metal precipitation and air stripping; reinjecting treated groundwater into the aquifer from which it was drawn; and monitoring groundwater to measure the effectiveness of the remedy. During pump and treat, residents were connected to public water supplies and their wells were closed. The IRA was completed in January 1994.

NATURAL RESOURCES - The beaches and bays around Whidbey Island are popular fishing and shellfish gathering areas. The bald eagle, a threatened species, and the peregrine falcon, an endangered species, may occasionally hunt at NAS Whidbey Island.

RISK - Eight sites at NAS Whidbey Island have been ranked high relative risk. Discussion follows on what has been done at these high risk sites. Three high risk sites are old landfills. Two of the landfills, Sites 5 and 6, are contributing to groundwater contamination which is migrating from beneath the landfills to off-site residences. Site 6 had three million gallons of liquid wastes deposited at the site. A cap is being placed on the landfill to prevent rainwater from infiltrating through the landfill and into the groundwater with additional contaminants. The cap was completed in FY97. The pump and treat system has been operational since June 1995.

OU 2 contains three high risk sites: Sites 4, 14 and 29. Site 4 is a former transformer storage area. Contaminated surface soils were threatening nearby wetlands, recreational areas and residential wells. Site 14 was a former pesticide disposal area. Contaminated groundwater at this site could have spread and threaten the sole source aquifer. Site 29 is a former fire training school. Contaminated soils and groundwater posed an ecological risk to humans and small mammals. In FY95, a remedial action (RA) was completed at OU 2 and soils contaminated with PCBs, organic compounds, and pesticides were removed.

OU 3 contains sites 16 and 31. Site 16 includes runway ditches. Contaminated soils and groundwater posed an ecological risk to humans and marine life. Site 31 is a former fire fighting training area. Possible exposure pathways include contaminated surface and subsurface soil, and contaminated groundwater. Receptors include humans and small mammals. At Site 16, a remedial action was completed to remove sediments contaminated with petroleum products, inorganics and organic compounds by dredging 7,000 linear feet of runway ditches. At Site 31, a petroleum skimming and bioventing system has been installed to remove petroleum from the groundwater.

An RA provided an additional wildlife area at OU 4 by creating a pond. Removal of backfill material was done intentionally to create a pit with gradually sloping sides in order to form a pond at the borrow area.

REGULATORY ISSUES

NATIONAL PRIORITIES LIST - In February 1990, NAS Whidbey Island was listed on the National Priorities List (NPL) with Hazard Ranking System scores of 39.64 for Seaplane Base and 48.48 for Ault Field. Placement on the NPL was due to the number of waste disposal and spill sites discovered. Contaminants at these sites included large quantities of petroleum products, solvents, paints, thinners, jet fuel, pesticides, and other wastes. There was also the potential for wastes originating from Ault field and the Seaplane Base to affect domestic drinking water wells and local shellfish beds.

Soil excavation activities at the Seaplane Base have sufficiently reduced the threat to human health and the environment. The State of Washington removed the Seaplane Base from their Hazardous Sites List on 22 August 1995. The EPA removed the Seaplane Base from the National Priorities List on 21 September 1995. This was the first such delisting for the Navy.

LEGAL AGREEMENTS - In September 1990, the Navy signed a Federal Facility Agreement (FFA) for Ault Field and the Seaplane Base. Individual sites within the two areas were grouped into Operable Units (OUs) to facilitate cleanup efforts.

The FFA specified that 26 sites undergo more intensive sampling programs, such as a Hazardous Waste Evaluation Study (HWES) for potential inclusion in an RI/FS. The HWES was completed. Sites 1 and 52 were recommended for an RI/FS as OU 5 due to soil and groundwater contamination. Sites 7-10, 19, 22-25, 27, 28, 32, 34, 40 and 53 were recommended for no-further-action (NFA). The other sites included in the HWES will undergo removal actions followed by confirmatory sampling.

PARTNERING - To improve working relationships and expedite the cleanup program, the Navy includes regulators and contractors in scoping meetings. The decision-making process has improved by providing technical information to the regulators prior to the submission of primary deliverables. Prior to beginning the RI/FS for OU 5, the Navy conducted extensive scoping discussions with the EPA and the State of Washington. Working together, an investigation and remediation strategy was developed. Consequently, there were minimal regulator comments on the RI/FS work plan, and the Navy was able to quickly complete the field sampling and the RI/FS document. The ROD for Operable Unit (OU) 3 was signed in April 1995 and the cleanup of OU 3 was also completed during FY95. Mutual trust between the Navy and the EPA helped expedite the cleanup process and saved significant environmental dollars.

COMMUNITY INVOLVEMENT

RESTORATION ADVISORY BOARD - The Technical Review Committee (TRC) was formed in 1988 and met quarterly. The TRC was converted to a Restoration Advisory Board (RAB) in FY94. This was one of the first five RABs within the Navy and Marine Corps. The twenty-five RAB members meet bi-monthly and have reviewed numerous technical documents. The Navy prepared a Reader's guide for the OU 5 RI/FS document. The Reader's guide is an expanded executive summary which provides a technical synopsis of the RI/FS and includes figures and data tables. The Reader's guide was well received by the RAB and the community.

COMMUNITY RELATIONS PLAN - The Community Relations Plan (CRP) was finalized in February 1991 and revised in FY95. A RAB brainstorming session was conducted to develop the list of community members to be interviewed as well as the interview questions. The Navy interviewed community members individually, and the entire community was invited to an open house to learn about the cleanup program and provide comments on the CRP update.

INFORMATION REPOSITORY - The administrative record is maintained at EFA Northwest, Poulsbo, Washington. Information Repositories have been established at the Oak Harbor Library in Oak Harbor, Washington; at the Coupeville Library in Coupeville, Washington; and at the NAS Whidbey Library in Oak Harbor, Washington.

WHIDBEY ISLAND NAS
HISTORICAL PROGRESS

FY84

IAS - An Initial Assessment Study (IAS) (equivalent to a PA) identified 52 past spill and/or disposal sites. 34 sites were recommended for further study or mitigating actions and potentially involve soil, groundwater, sediment, and shellfish contamination.
Sites 1, 7-12, 15, 30, 33, 34 and 46-51 - Recommended for No Further Action (NFA) based on lack of information concerning migration or exposure pathways and contaminant concentrations.
Site 52 - Described in the IAS but not identified as a site until later.

FY88

Sites 2-6, 13, 14, 16-29, 31-32 and 35-45 - A Current Situation Report (CSR) (equivalent to an SI) was completed. Sites 2 and 3 had groundwater contamination and discoloration of a few water samples. Site 4 had low levels of PCBs found in the soil. Oily seeps were found downgradient of Site 5. At Site 6, elevated levels of iron and chromium were found, and specific conductivity suggesting potential downgradient groundwater contamination. The CSR found no detectable pesticide or herbicide contamination of soil or groundwater at Site 14, although inhibited vegetation growth was observed in this area. At Site 16, significant concentrations of petroleum hydrocarbons, trace metals, and polynuclear aromatic hydrocarbons (PAHs) were found in soil and groundwater. At Site 29, significant concentrations of lead, organic halogens, and PAHs were found in soil. At Site 31, the CSR found surface soil contaminated with lead, organic halogens, PCBs, and PAHs. The Ault Field Sites were found to have groundwater contaminated with petroleum hydrocarbons, organic carbon, and organic halogens. Sites 35-45 had slightly elevated levels of trace metals detected in sediment and shellfish. All sites except for Sites 32 and 38 were recommended for an RI/FS. Sites 32 and 38 were recommended for no further action.
Sites 21, 26, 37, 42 and 43 - These sites were moved to the UST Program.

FY90

Sites 12, 21, 26, 30, 33, 37, 38, 42, 43, 46, 47, 50 and 51 - No further action recommended, although Site 42 did have further study.

FY91

Site 43 - Two removal actions were completed to remove tanks and petroleum contaminated soil.
Sites 12, 113 and 138 - Interim Removal Actions were completed.
USTs 12, 117, 212 and 420 - The Remedial Investigation was completed.

FY92

An FFA required additional sampling.
Extended SIs were completed.
OU 1 - In April 1992, the Department of the Navy signed an Interim Record of Decision (IROD) with EPA Region X and the State of Washington for an Interim Remedial Action (IRA).
Site 42 - The Remedial Investigation was completed.
Sites 420 and 212 - The Remedial Action was completed.

FY93

OU 1 - An RI/FS was completed. The final RI/FS recommended capping of the landfill.
OU 2 - An RI/FS was completed. The final RI/FS recommended removal and off-site disposal of soils containing PCBs, pesticides and PAHs.
OU 4 - An RI/FS was completed. Small scale removals and off-site disposal of contaminated soils were recommended.

FY94

HWES - A Hazardous Waste Evaluation Study (HWES) performed in 1994, recommended 17 sites for No Further Action (NFA).
Site 11 - A removal action was completed, residual contamination remained.
Site 37 - Abandoned Seaplane Based Oil tanks. An RA was completed, residual contamination remained.
Site 16 of OU 3 - An RI/FS was completed.
OU 1 - Sites 5 and 6 are landfills. LTM at Area 5. RD completed at Area 6.
OU 2 - ROD signed and RD completed. (Sites 2, 3, 4, 14 and 29)
OU 3 - Site 16 and 42, Seaplane gas tank corrective action plan was completed, residual contamination remained.
OU 4 - RD completed (Sites 39, 41, 44, 48 and 49) RA was initiated.
OU 5 - Started RI/FS (Sites 1, 31 and 52.)
USTs 53 and 60 - Remedial Investigation was completed.
USTs 12, 53, 60, 116, 121, 137, 214, 313, 386, 415, 500, 510, 599, 889, 977, and 2708 - Remedial Action was completed. USTs were removed from Whidbey Island in FY95.
Site 42 - A Corrective Action Plan was completed.

FY95

CRP - Updated Community Relations Plan (CRP).
Site 6 of OU 1 - Groundwater contamination from a former Navy landfill was migrating off-base and threatening private landowners. A pump and treat system was installed and began full scale operations. During pump and treat, residents were connected to public water supplies and their wells were closed. The landfill is currently being capped.
OU 3 - A ROD was signed in April 1995 and Remedial Design (RD) completed. A Remedial Action (RA) is underway to remove sediments contaminated with organic compounds, inorganics, and PAHs, by dredging 7,000 linear feet of runway ditches. Additional cleanup actions include: testing the dredged sediments and comparing the test results to federal and state regulations to determine if the sediments are hazardous; disposing of non-hazardous sediments in the base landfill.
OU 2 - Remedial Action was completed and soils contaminated with PCB, organic compounds and pesticides were removed. Initiated LTM.
OU 4 - The final Remedial Action was completed on soils contaminated with arsenic, chromium, lead, organic compounds and pesticides. An on-site borrow soil area provided a backfill material source. Analysis of a composite sample from the borrow soil area confirmed that the soil was free of contamination. Removal of backfill material was done intentionally to create a pit with gradually sloping sides in order to form a pond. Thus, the remedial action program provided an additional wildlife area by creating a pond at the borrow area. LTM not required.
NPL - The Seaplane Base was delisted from the National Priority List (NPL) and the State of Washington's Hazardous Sites List. LTM not required.
OU 5 - An RI/FS was completed. Initiated proposed RA plan.
Sites 15, 20 and 45 - Tanks removed.

FY96

Site 6 - The RA to pump and treat groundwater continued to operate. Added Bacteriological controls to air stripper. Improved cap design to reduce risk to human health contaminants. Upgrades to pump and treat systems were initiated and completed.
Site 51 - Initiated Washington State Hazard Assessment at Lake Hancock.
OU 2 - Continued LTM.
OU 3 - RA completed at Site 16.
Sites 1, 31 and 52 - RI/FS completed.
OU 5 - Signed and completed ROD for Site 31. RD complete at Site 31. Monitoring continued at Site 1.
Sites 1, 4, 14, 15, 16, 20, 29 and 52 - RA completed.
Sites 1, 2, 3, 4, 5, 6, 14, 15, 16, 20, 29, 31, 42 and 52 - IRAs (number of IRAs in parentheses) completed at Sites 1(2), 2(2), 3(2), 4(3), 5(2), 6(6), 14(3), 15(1), 16(1), 20(1), 29(3), 31(2), 42(1) and 52(2).
Sites 1-5, 14-16, 20 29, and 49 - Response Complete.
UST 2 - Completed removal action and closed in place.

Whidbey Island NAS
PROGRESS DURING FISCAL YEAR 1997

FY97

Site 51 - Washington Site Hazard Assessment was ongoing at Lake Hancock.
Site 5 - Continued LTM.
Site 6 - Continued LTO and LTM of upgraded pumps and treatment system. IRA (landfill cap) was completed.
OU 2 - Continued LTM.
Site 1 - Continued LTM.
Sites 11, 13, 35, 36, and 45 - IRAs were completed. Began delisting process of Ault Field. Construction-complete documentation developed and approved.
Site 31 - Completed RD, RA, and three IRAs.

PLANS FOR FISCAL YEARS 1998 AND 1999

FY98

Site 42 - Complete RD.
OU 2 - Continue LTM.
OU 3 - Continue to close monitoring wells.
Sites 5 and 45 - Complete RI/FS; Response Complete anticipated.
Site 1 - Continue LTM.
Site 51 - Complete PA/SI and RI/FS; Response Complete anticipated.
Site 31 - Continue LTO and LTM.
Site 52 - Complete RA.
Site 6 - Continue LTO and LTM activities. Complete RA.

FY99

OU 1 - Continue LTO and LTM at OU 1 (Site 6).
OU 5 - Continue LTO and LTM at OU 5 (Sites 31 and 52).
USTs 60, 95, 214, 268, 420, 500 and 599 - Complete corrective action plan.
OU 3 - Continue to close monitoring wells.
Site 42 - Complete RA.
Sites 13 and 35 - Complete RD
Sites 11, 13, 21, 35, 36, 42 and 45 - Expect to complete RI/FS.

PROGRESS AND PLANS

CERCLA	FY96 and before	FY97	FY98	FY99	FY00	FY01	FY02	FY03 and after
PA / SI	52		1			1		
RI / FS	34		3	7			1	
RD	5	1	1	2	4			1
RAC	13	1	2	1	2	3		2
RAO								11
IRA	21(38)	7(9)						2(2)
RC	40		3					11
Cumulative % RC	74%	74%	80%	80%	80%	80%	80%	100%

UST	FY96 and before	FY97	FY98	FY99	FY00	FY01	FY02	FY03 and after
SA	8							
CAP				7				
DES					6			
IMP	26				7			
IMO								7
IRA	32(32)							
RC	29							7
Cumulative % RC	81%	81%	81%	81%	81%	81%	81%	100%